

ITEM L-131 DEMONSTRATIONS, TESTS AND PERFORMANCE VERIFICATION

DESCRIPTION

131-1.1 GENERAL. This item includes the furnishing of all labor, materials, equipment and services necessary to provide demonstrations, testing and performance verification necessary to show electrical system compliance to these specifications.

DEMONSTRATIONS

131-2.1 CHECK-OUT MEMO. Where required by the plans and specifications, provide manufacturer assistance during the testing, start-up, performance verification, demonstrations and Owner training. Complete the Check-Out Memo contained in Appendix A Figure 1.

131-2.2 Demonstrate the essential features of the following electrical systems:

~~Alarms and bells~~
Fuses and fuseholders
~~Metering/Monitoring~~
Electrical systems controls and equipment
Electrical power equipment
Relays
Special transformers
Panelboards
Distribution panels
Main panels, power panels
Circuit Breakers
Wiring devices
Wiring systems
Grounding systems
~~Face plates~~
~~Low-voltage controls~~
~~Outlets: convenience, special purpose~~
~~Switches: regular, time~~
~~Voltage stabilizers~~
Airfield lighting fixtures
~~Constant Current Regulators~~
~~Local Control Panel~~
Airfield Lighting Control System
ATCT Control Panel
~~L-854 Radio Controller~~
~~Runway End Identifier Lights (REILS)~~
~~Precision Approach Path Indicator (PAPI)~~

131-2.3 The demonstration shall be held upon completion of all systems, including testing, at a date to be agreed upon in writing by the Owner or his designated representative. The demonstration shall be held by the Contractor in the presence of the Owner and the Manufacturer's Representative.

131-2.4 Prior to acceptance of the work, the Contractor shall demonstrate to the Owner, or his designated representative, all features and functions of all systems and shall instruct the Owner in the proper operation of the systems. After testing is completed satisfactorily, each system shall be demonstrated once.

The demonstration shall consist of not less than the following:

- a. Point out the actual location of each component of the system and demonstrate its function and its relationship to other components within the system.
- b. Demonstrate the electrical systems by actual "start-stop" operation showing how to work controls, how to reset protective devices, how to replace fuses, and what to do in an emergency. Indicate each item's relationship to the riser diagrams and drawings.
- c. Demonstrate communication, signal, alarm and detection systems by actual operation of the systems and show how to reset signal, alarm and detection devices.

The Contractor shall furnish the necessary trained personnel to perform the demonstration and instructions, and shall arrange to have the manufacturer's representatives present to assist with the demonstrations.

All functional and operational testing of protective interlocking, automatic controls, instrumentation, alarm systems, and all other field testing of the main systems will be completed before the systems are demonstrated.

131-2.5 Submit five (5) copies of the Performance Verification and Demonstration to Owner Form (Appendix A Figure 2), signed by the Contractor, subcontractor and Owner and insert one copy in each Operation and Maintenance Manual and the original shall be inserted in the Project Closeout Documentation Manual.

TESTS AND PERFORMANCE

131-3.1 TESTS AND PERFORMANCE VERIFICATION. Operate system for a 3-day period. Do performance verification work as required to show that the system is operating correctly in accordance with design. Supply instruments required to read data. Adjust system to operate at the required performance levels. Tabulate data for submission. Submit data on 8 ½" x 11" sheets with time and name of checker. Where specific performance verification information is called for in the specifications, use copies of the sheets provided for recording readings. Data shall be submitted and approved before Check-Out Memos are signed or a request for final inspection is made. Submit data in Operation and Maintenance Manuals.

At completion of construction after all performance verification and testing information has been gathered, submitted, and approved, provide one copy of this information to the Manufacturer's representative of the equipment. Work required under this section shall include having the representative examine the performance verification information, check the equipment in the field while it is operating, and sign a Check-Out Memo for a record. Submit five (5) copies of the Check-Out Memo on each major item of equipment. Approved memos shall be inserted in each Operation and Maintenance Manual with the performance verification information. Memos shall be submitted and approved before instruction to Owner or a request for final inspection.

131-3.2 TESTS. After cables are in place, but before being connected to devices and equipment, the system shall be tested for shorts, opens, intentional and unintentional grounds by means of an approved type of "megger." Airfield lighting cables shall be tested in accordance with Item L-108, Installation of Underground Cable for Airports.

The tests shall be performed and recorded in the presence of the Engineer and the Owner and the test results shall be placed in the Operation and Maintenance Manuals. All wires in conduit that are shorted or unintentionally grounded shall be replaced.

Take readings of voltage and amperage at building main disconnect switch and at main for each panel, at primary side of each lighting transformer and at the end of the longest branch circuit at each panel. The above readings shall be taken (1) "no load" conditions and (2) at "full load" conditions with all equipment using electricity. Tabulate readings, complete "Voltage and Amperage Readings/Tabulated Data" form (see Appendix A Figure 3) and submit in the O&M Manuals.

The resistance between ground and absolute earth shall be measured by the Contractor before equipment is placed in operation. ~~Testing shall be performed on all ground rod installations before connecting the grounding conductor. The resistance between each ground rod and absolute earth shall not exceed twenty five (25) ohms. Testing shall be three (3) point method in accordance with IEEE recommended practice and witnessed by the Engineer and Owner.~~ Record data on the Ground Test Information form contained in Appendix A Figure 4. All ground rods shall be tested.

Perform such tests as required by authorities having jurisdiction over the site, or other tests/inspections as required by other sections of this specification.

There are no approved "repair" procedures for items that have failed testing other than complete replacement. Any other corrective measures shall be approved by the Engineer. The addition of ground rod sections to the ground rods shall be considered replacement for this item.

131-3.3 CORRECTION OF ERRORS. The Contractor shall immediately correct any errors or omissions in his work which are discovered during testing. This shall include but not be limited to, improper phasing resulting in reverse rotation, misinterpretations, incomplete grounding, damaged equipment or materials, or incomplete work the Contractor has already verified as being complete. The Contractor shall immediately replace, repair, or complete these errors and omissions as soon as they are brought to his attention, even if this requires disruption of his scheduled construction activities or work on an overtime basis. Failure to take immediate action or an excessive number of errors or omissions shall make the Contractor liable for the time lost by the Owner's operating forces, and any other personnel.

METHOD OF MEASUREMENT

131-4.1 The items described in this section are incidental to other sections and shall not be measured for payment.

BASIS OF PAYMENT

131-5.1 No direct payment shall be made for the work described in this section. The work described in this section is incidental to other items and shall be paid for in the respective bid item of which it is a component part.

CHECK-OUT MEMO

This form shall be completed and a copy provided to the Owner at the Owner's Performance Verification and Demonstration meeting. A copy shall also be included in the specification section of the O & M Manual for the equipment checked.

Project Name: _____
Type of Equipment Checked: _____
Equipment Number: _____
Name of Manufacturer: _____

Signature below by the manufacturer's authorized representative signifies that the equipment has been satisfactorily tested and checked out on the job by the manufacturer.

1. The attached Test Data and Performance Verification information was used to evaluate the equipment installation and operation.
2. The equipment is properly installed, has been tested by the manufacturer's authorized representative, and is operating satisfactorily in accordance with all requirements, except for items noted below.*
3. Written operating and maintenance information has been presented to the Contractor, and gone over with him in detail.
4. Sufficient copies of all applicable operating and maintenance information, parts lists, lubrication checklists, and warranties have been furnished to the Contractor for insertion in the Operating and Maintenance Manuals.

Checked By: _____
(Print or Type Name of Manufacturer's Representative)

(Address and Phone No. of Representative)

(Signature and Title of Representative)

(Date Checked)

Witnessed By: _____
(Signature and Title of Contractor Representative)

* Exceptions noted at time of check-out (use additional page if necessary):

APPENDIX A - FIGURE 1

PERFORMANCE VERIFICATION AND DEMONSTRATION TO OWNER

This form verifies that the Owner has been given a demonstration of the proper operation on the equipment or systems noted below:

Project Name: _____
Specification Division Number & Name: _____
Equipment/System Demonstrated: _____

Along with a complete demonstration of the equipment/system, these items have been reviewed at this demonstration and shall be included in the Operating and Maintenance Manuals, under the appropriate specification section:

- 1) Written operating instructions.
- 2) Test data and performance verification information as required by the installer and/or manufacturer.
- 3) Maintenance information published by manufacturer or equipment.
- 4) Check-out Memo signed by manufacturer's representative.
- 5) Printed warranties by manufacturer of equipment.
- 6) Explanation of the warranty/guarantee on the system.
- 7) Prints showing actual "As Built" conditions.

(Name of Contractor)

(Signature, Title, Date)

(Name of Subcontractor)

(Signature, Title, Date)

Demonstration of the system/equipment in operation and of the maintenance procedures has been successfully completed.

OWNER

(Signature, Date)

(Owner's Department)

APPENDIX A - FIGURE 2

VOLTAGE AND AMPERAGE READINGS/TABULATED DATA

This form may be used to record voltage and amperage readings (within the panel and from the farthest point, please check the appropriate item below). Copy of this completed form shall be included in the specification section of the O & M Manual for the equipment from which readings are taken.

Project Name: _____

Specification Division Number & Name: _____

Switchgear/Panel Number: _____

Readings taken within panel: _____ from farthest point: _____

Full Load Amperage Readings:

Date: _____

Time: _____

Phase: A _____

B _____

C _____

N _____

Full Load Voltage Readings:

Date: _____

Time: _____

Phase: A to N _____

A to B _____

B to N _____

A to C _____

C to N _____

B to C _____

No Load Voltage Readings:

Date: _____

Time: _____

Phase: A to N _____

A to B _____

B to N _____

A to C _____

C to N _____

B to C _____

Contractor's Representative: _____

Engineer's Representative: _____

Owner's Representative: _____

APPENDIX A - FIGURE 3

GROUND TEST INFORMATION

GROUND LOCATION: _____

PRIOR TO CONNECTION TO SYSTEM:

GROUND: _____ (OHMS)

WEATHER CONDITIONS FOR PREVIOUS WEEK: _____

AFTER CONNECTION TO SYSTEM:

GROUND: _____ (OHMS)

CONTRACTOR'S REPRESENTATIVE: _____

DATE: _____

APPENDIX A FIGURE 4

MOTOR TEST INFORMATION
NOT USED

Project Name: _____

Description of Motor: _____

Checked By: _____

Date Checked: _____

- | | | |
|----|---|-------|
| a) | Name and Identifying Mark of Motor | _____ |
| b) | Manufacturer | _____ |
| c) | Model Number | _____ |
| d) | Serial Number | _____ |
| e) | RPM | _____ |
| f) | Frame Size | _____ |
| g) | Code Letter | _____ |
| h) | Horsepower | _____ |
| i) | Nameplate Voltage and Phase | _____ |
| j) | Nameplate Amps | _____ |
| k) | Actual Voltage | _____ |
| l) | Actual Amps | _____ |
| m) | Starter Manufacturer | _____ |
| n) | Starter Size | _____ |
| o) | Heater Size, Catalog No. and AMP Rating | _____ |
| p) | Manufacturer of Dual-Element Fuse | _____ |
| q) | Amp Rating of Fuse | _____ |
| r) | Power Factor | _____ |

(Signature of Checker)

(Print or Type Name of Checker)

(Company Name of Checker)

(Signature of Contractor Representative)

(Print or Type Name of Contractor Representative)

(Company Name of Contractor Representative)

APPENDIX A - FIGURE 5

CABLE INSULATION RESISTANCE TEST RECORD

Circuit Description: _____

Date: _____ Time: _____

Phase A to Ground _____ Megohms

Phase B to Ground _____ Megohms

Phase C to Ground _____ Megohms

Neutral to Ground _____ Megohms

Phase A to B _____ Megohms Phase A to Neutral _____ Megohms

Phase A to C _____ Megohms Phase B to Neutral _____ Megohms

Phase B to C _____ Megohms Phase C to Neutral _____ Megohms

Weather Conditions: _____

Temperature: _____

Circuit Condition Prior to Test: _____

Tested By: _____ Date: _____

Witnessed By: _____

Owner's Authorized Representative: _____

Date: _____

APPENDIX A - FIGURE 6**END OF ITEM L-131**